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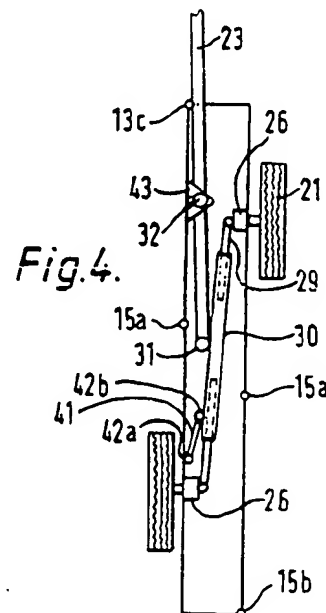
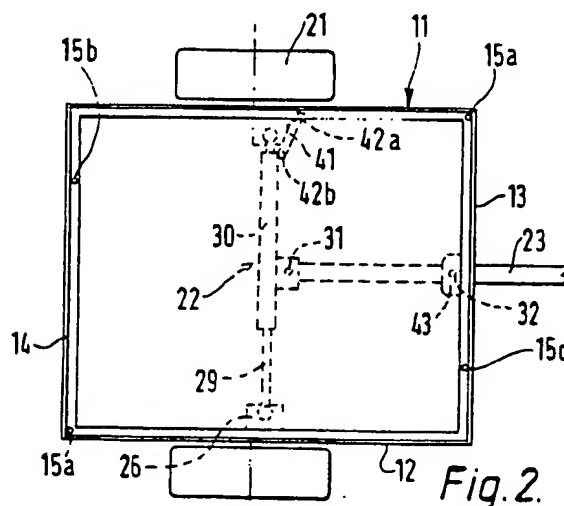
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(54) Foldable trailer

(57) The trailer comprises a tow bar 23 attached to a rectangular frame with sides and wheels 21 and a floor 17 supported by the frame and hinged for movement into a raised position. The wheels are supported on an axle of variable length and the tow bar is pivotally connected to the axle 22. The frame is hinged about four vertical pivotal connections 15a, b, c which are arranged at the corners of an imaginary parallelogram, two of which are at diagonally opposed corners of the frame. The frame is held square by the floor and when the floor is removed, for example by lifting it up, the frame can be folded around the four pivotal connections so that the width of the trailer is reduced. As the side members move together the axle increases in length by telescoping movement of the outer components 29 within the central component 30. In an alternative arrangement the hinges are disposed at the four corners of the trailer frame so that the frame becomes a rhombus on folding.



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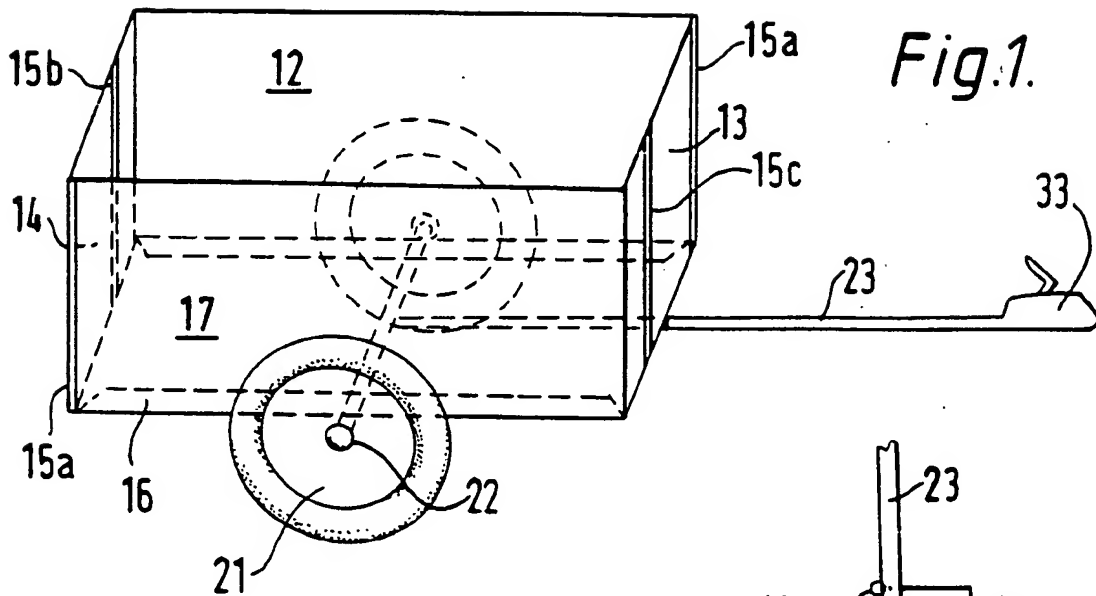
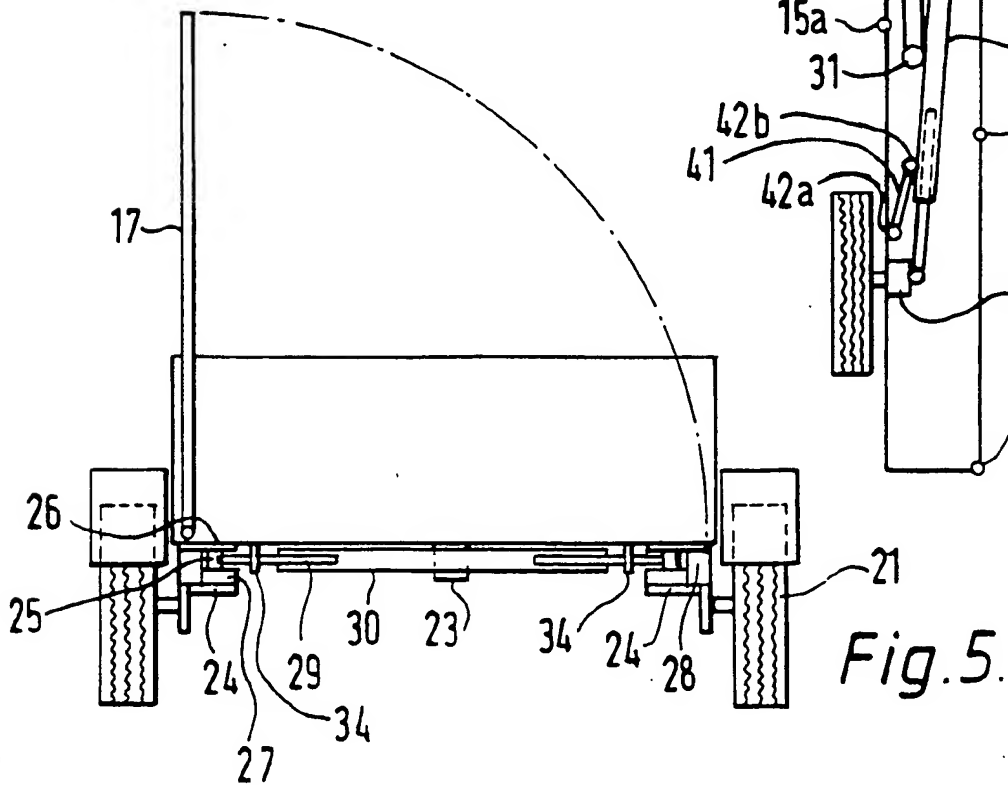
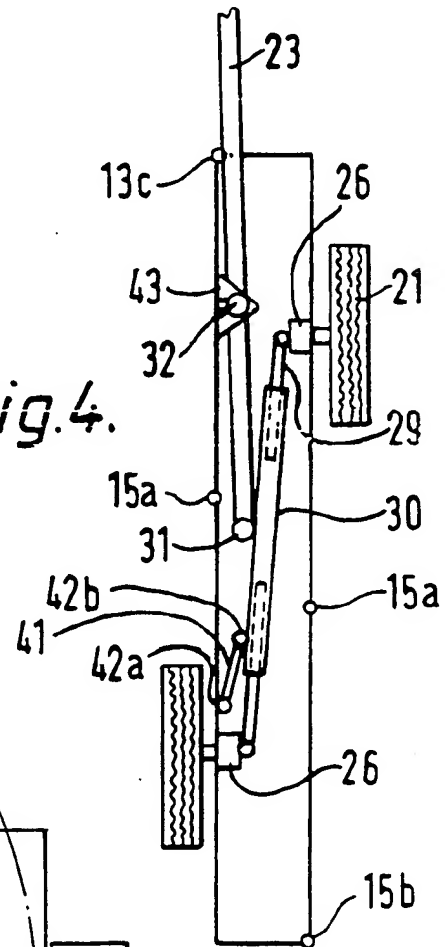
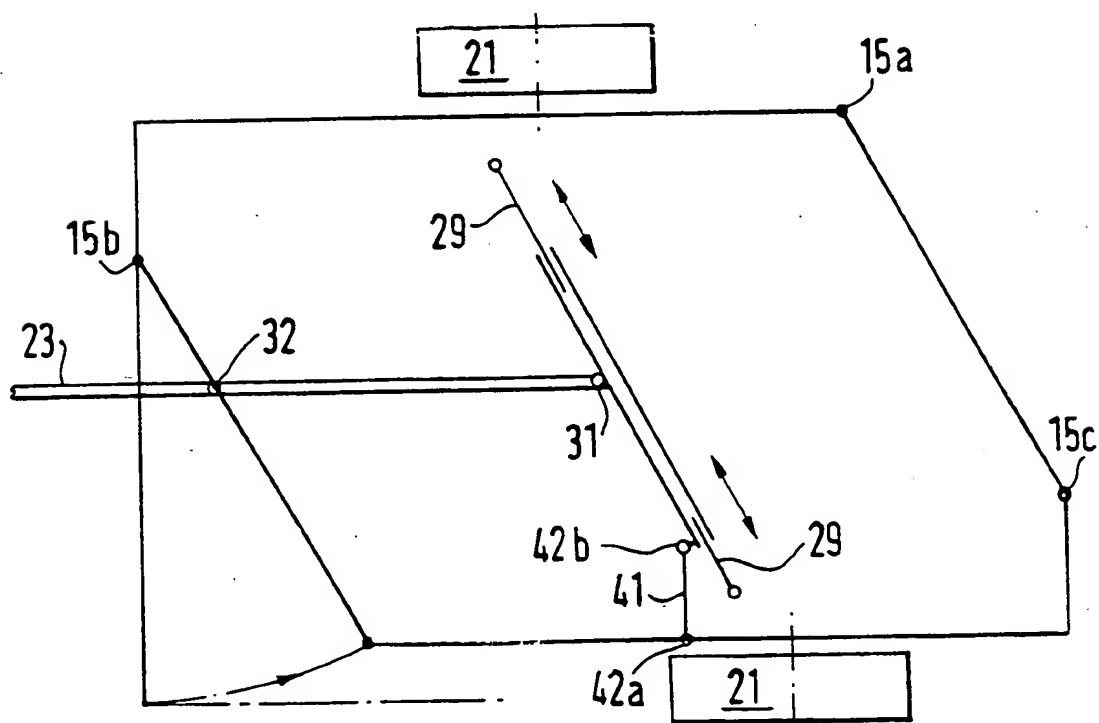
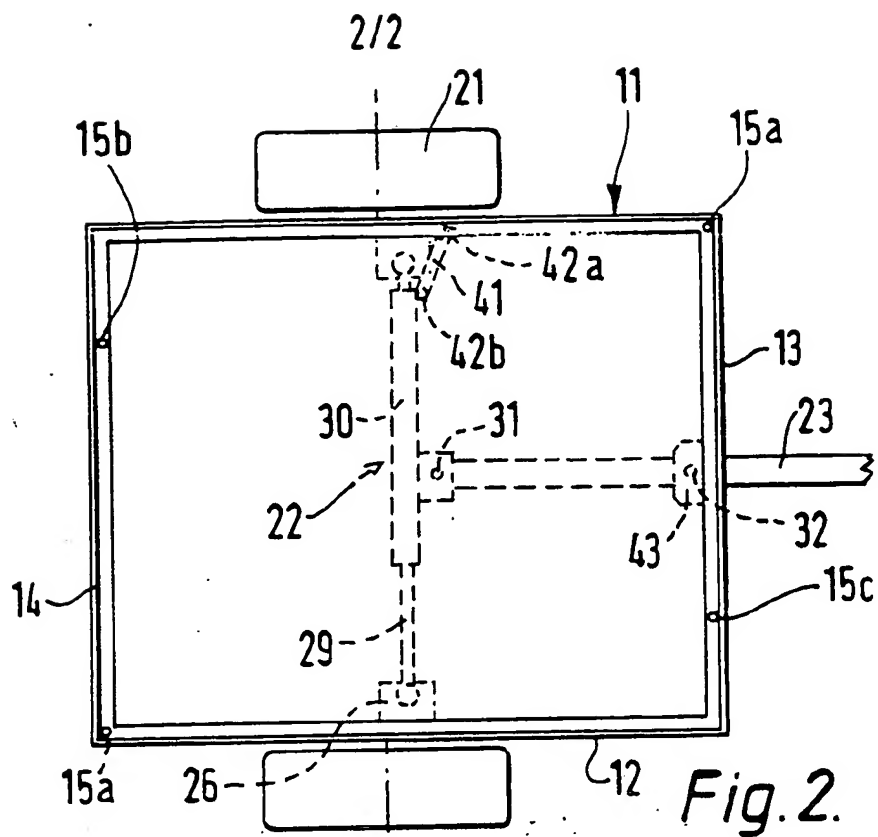


Fig. 4.





FOLDABLE TRAILER

The present invention relates to a foldable trailer and is applicable equally to road trailers and trailers for use in the garden for example to be towed by a tractor lawn mower.

Although storage space is always at a premium, people are still resorting to the use of small trailers to facilitate the handling and movement of articles; for example the transport of household and garden rubbish to an amenity site, compost or manure to a garden site, or extra articles on holiday. As few people have adequate storage for these trailers under cover, they remain in the garden as unsightly obstacles.

According to the present invention there is provided a trailer comprising a tow bar attached to a rectangular frame and a floor supported by the frame, the frame supporting two wheels and an axle and including a front element, two side elements and a rear element wherein the frame is pivotally connected together at pivotal connections arranged at the corners of an imaginary parallelogram, at least two of the said pivotal connections being at diagonally opposed corners of the frame, and wherein the axle is pivotable with respect to the side elements and is adjustable in length, and the floor being liftable from the frame, the arrangement being such that when the floor is lifted the side elements may be moved towards each other to reduce the width of the trailer.

Preferably the tow bar is also pivoted to the front of the frame. Advantageously the axle comprises three components, a central component to which the tow bar is pivotally mounted and two outer components which are pivotally mounted to respective sides of the frame, the outer components being slidably mounted to the central

component to cater for adjustments in the length of the axle.

Preferably the outer components are telescopically mounted to the central component. If two pairs of wheels  
5 are required, the second set will require an axle pivotally mounted to the frame and of adjustable length.

The floor may be pivotally mounted to one side of the frame so that lifting the floor allows the frame to fold. Optionally the floor may additionally be hinged  
10 parallel to the said pivotal mounting so that the floor additionally folds.

The invention will now be described, by way of example, with reference to the accompanying drawings all of which are sketches and not to scale, and in which:-  
15 Figure 1 is a sketch in perspective of a trailer according to the present invention,  
Figure 2 is a plan view of the trailer of Figure 1 without the floor,  
Figure 3 is a sketch illustrating the folding action of the trailer of Figure 2,  
20 Figure 4 is a plan view of the folded trailer of Figure 2, and  
Figure 5 is a cross section through a trailer according to a second embodiment of the present invention,

25 The illustrated trailer comprises a frame 11 comprising four elements, two side elements, a front element and a rear element. At least three of these elements may include walls, two side walls 12 and a front wall 13. The rear element of the trailer may also  
30 include a wall 14 as shown, or may alternatively include a gate hinged horizontally to the frame 11 and removable from the frame by sliding hinge pins out of hinge sockets. The frame 11 including the walls 12,13,14 is freely pivotable by moving the side walls towards one  
35 another to reduce the width of the trailer. To enable

this to happen four vertical pivot points or hinges 15 are arranged in suitable places on the trailer, two 15a at diametrically opposed corners of the frame. These two will each be located between a side element and a front or rear element. The other two hinges 15b, 15c may be located at the other two corners of the frame ( Figure 5) or, as illustrated in the other Figures one 15b on the rear element and one 15c on the front element at the same distance from the other two corners 15a. In either arrangement the four hinges are arranged to be at the corners of an imaginary parallelogram.

The frame includes angle pieces 16 at the bottom of each of the walls, which pieces in use support a floor 17. The floor 17 illustrated is a one piece element hinged to one side of the trailer at the respective angle piece 16. It is pivotable between a raised position allowing the trailer to be folded to a horizontal position in which it is supported flat by the angle pieces 16 and holds the frame square. It may be held in either position by a suitable catch (not shown).

When folded the frame of Figure 1 takes up a rectangular shape. The other version described with respect to Figure 5, becomes rhomboid when folded. The two trailers operate basically on the same principle and can be taken to be the same apart from the differences described and illustrated.

The trailer frame is drawn by a tow bar 23 and includes an axle 22 which carries a wheel 21 at each end. The wheels 21 on each side are mounted in the usual way to the base of the frame, in this case via a suspension mounting 24. Between the suspension mounting 24 and the angle piece 16 at the base of the frame 11 there is a pivotal mounting for the axle formed from a roller 25 bored to receive a bolt (not shown). The bolt is fixed to two plates 26, 27 the upper of which is fixed to the angle piece 16 and the lower to the suspension.

mounting 24, the two plates being separated by a box section 28.

5 The axle comprises three components, two outer components 29 which are connected one to each roller 25 to pivot with respect to the frame 11, and a central component 30 which is angularly fixed with respect to the outer components and is moveable longitudinally of them. This is achieved by a telescopic arrangement of the outer components slidably mounted within the central component 30. In the embodiment of Figure 1 the central component extends almost completely to one side and only partially to the other side. This is so that it has a sufficient length to move over the outer component when the trailer is folded. The central component is 10 maintained in the correct position by a link bar 41 which is pivotally mounted at each end one 42a to the angle piece 16 on one of the side elements and the other 42b to the central component 30. This bar restricts the movement of the central component 30 on the outer components 29 by pushing it towards the centre as the trailer folds and pulling it back as the trailer is opened out for use. This maintains the central position of the tow bar towing point 31 to be described hereafter.

25 The tow bar 23 by means of which the trailer is attached to a towing vehicle has a towing point 33 and is hinged both to the central component of the axle at 31 and to the front of the frame at 32. The mounting of the tow bar to the central component is off-centre of the central component. The mounting at the front of the frame includes a slot on a bracket 43 which slot enables the tow bar to slide relative to the front element so that the distance between the two tow bar pivot points is adjustable to enable the trailer to be folded without 30 detaching the tow bar.

When the trailer is in use with the floor horizontal, the axle lies transverse to the trailer. In the alternative embodiment of Figure 5 in which the hinges 15 are at the four corners of the trailer instead of a link bar 41 there is provided a stop 34 on each on the two outer components of the axle which limits the movement of the central component over the outer components 29 so that the position of the tow bar remains substantially constant in relation to the trailer. It will be observed that in this embodiment the tow bar is mounted centrally of the central component.

When the trailer is to be folded, the tailgate, if there is one, is first removed, then the floor catch is released and the floor is raised and secured to the side. The four sides of the frame are now pivotable with respect to one another and can be folded to a substantially flat state. The folding action is illustrated in Figure 3 and the folded trailer in Figure 4. The length of the axle increases as the opposed sides move and the central component is able to move freely across the outer components as it needs to without touching or being hindered by the stops 34. The actual position taken up by the central component 30 on the outer components 29 at any stage during the folding process will be constrained by the position of the tow bar. The tow bar is able to lie substantially along the line of the folded trailer. The existence of the three part axle enables the folding to take place without detaching the tow bar or affecting the wheels. The wheels will remain parallel to the side walls.

Thus an extremely robust trailer can be provided which nevertheless can be folded away for storage when not required.



## CLAIMS

1. A trailer comprising a tow bar attached to a rectangular frame and a floor supported by the frame, the frame supporting two wheels and an axle and  
5 including a front element, two side elements and a rear element wherein the frame is pivotally connected together at pivotal connections arranged at the corners of an imaginary parallelogram, at least two of the said pivotal connections being at diagonally opposed corners  
10 of the frame, and wherein the axle is pivotable with respect to the side elements and is adjustable in length, and the floor being liftable from the frame, the arrangement being such that when the floor is lifted the side elements may be moved towards each other to reduce  
15 the width of the trailer.
2. A trailer according to claim 1 wherein the tow bar is pivotally mounted to the axle and to the front element of the frame.
3. A trailer according to claim 1 or 2 wherein the  
20 axle comprises three components, a central component, and two outer components which are pivotally mounted to respective side elements of the frame, the outer components being slidably mounted with respect to the central component to cater for adjustments in length of  
25 the axle.
4. A trailer according to claim 3 wherein the outer components are telescopically mounted to the central component.

5. A trailer according to claim 3 or 4 including a link bar pivotally mounted between the central component and the side element of the frame.

5 6. A trailer according to any of the preceding claims wherein the other two pivotal connections are at the other two opposed corners of the frame.

7. A trailer according to any of claims 1 to 5 wherein the other two pivotal connections are one on the front  
10 element and the other on the back element of the frame.

8. A trailer according to claim 7 wherein the said other two pivotal connections are between the centre of the respective element of the frame and diagonally  
15 opposed corners which are not pivoted.

9. A trailer according to claim 5 including stops on the outer components arranged to limit the transverse movement of the central component.

10. A trailer substantially as herein described with  
20 reference to the accompanying drawings.